

of the wall with a plate of glass, well cemented round on all sides; and it appeared evident that the whole quantity formed under these circumstances, was nearly equal to that which usually formed on the same surface when exposed to the free action of the atmosphere.

The author concludes this paper with an analysis of the stone of which the laboratory is built, showing that it contains 96 per cent. of carbonate of lime, the rest being sand, oxide of iron, ochry clay, with a trace of animal matter, which is conceived to be from the shells contained in the stone.

He also gives the result of his experiments on the nitre collected in this situation, which shows that the quantity of calcareous salt contained in it does not exceed $\frac{1}{25}$ th part, instead of being a principal constituent, as authors have asserted.

On the Nature of the Salts termed triple Prussiates, and on Acids formed by the union of certain Bodies with the Elements of the Prussic Acid. By Robert Porrett, jun. Esq. Communicated by William Hyde Wollaston, M.D. Sec. R.S. Read June 30, 1814. [*Phil. Trans.* 1814, p. 527.]

Although it be very well known that the properties of the triple prussiates depend on the presence of an oxide of iron, the differences between these and the simple prussiates in being neutral, and with difficulty decomposed, are by no means explained; and the object of the author is to reconcile these anomalies with the general properties of other saline bodies.

The facts observed by him have led him to consider the salts, hitherto termed triple prussiates, as binary salts consisting of a single base, combined with a very compound acid, in which iron enters as a constituent along with the elements of prussic acid. The leading experiments on which this opinion is founded are two; first, the decomposition of a triple prussiate of soda by the voltaic battery, which occasions the alkali to go alone to the negative pole, and carries the iron not to the negative as a base, but to the positive pole, as one of the elements of the acid part of the salt. In a second experiment he decomposes a triple prussiate of barytes by sulphuric acid, and obtains a fluid having all the characters of an acid, which forms directly with alkalis, earths, and oxides, the salts termed triple prussiates, and by superior affinity displaces carbonic and acetic acids from their combinations.

By distillation this acid may be decomposed into prussic acid and oxide of iron, which has therefore been thought to be present as a base, by those who have overlooked the circumstance of the compound being acid, and in fact a much stronger acid than the prussic acid itself. Accordingly, when it is not exposed to too great a heat, this acid is transferred entire from one base to another, in many instances, of double decomposition, and produces effects altogether dissimilar to those of mere prussic acid.

The author observes also, that there are other substances beside

oxide of iron that are capable of forming peculiar acids with the elements of prussic acid; and the most remarkable of these is sulphur, which makes an acid of a red colour, having always the same properties, though formed in various different ways. The first method by which Mr. Porrett formed this acid, was by boiling together sulphuret of potash with prussian blue; but he has also made it by the same sulphuret with prussiate of mercury. Also by heating together sulphuret of potash with animal charcoal, and by sulphate of potash with the same coal. Also by boiling a simple alkaline prussiate with sulphur, or by mixing prussiate of ammonia with hydroguretted sulphuret of potash. Since one of the properties of this acid is to form an insoluble compound with copper, the author takes advantage of this valuable property for obtaining the acid in a pure state. After decomposing a salt of copper for this purpose, a quantity of sulphuric acid is poured on the precipitate, and the whole submitted to gentle distillation, by which the acid is obtained nearly pure, or may be easily purified. The author examines the salts formed by union of this acid with the several alkalies, earths, and metallic oxides, showing that it may be transferred from one to another without change of its properties, and supporting his opinion that it should be regarded as an acid of a peculiar and extremely compound nature.

For the acids here described, the author invents names by combining the initials of three of their constituents, carbon, hydrogen, and azote, which give him the term Chyazic; and hence he denominates the former Ferruretted Chyazic acid, and the latter Sulphuretted Chyazic acid. By careful analysis of the former, the author found 17·26 oxide of iron in 47·66 of the dry acid; and in 18·4 of the latter he found 12 of sulphur.

In the course of these experiments Mr. Porrett examines and describes the precautions which are necessary in ascertaining the quantity of iron present in any solution by the quantity of prussian blue that can be formed: and he also shows the use that may be made of the sulphuretted chyazates as precipitants of copper. He observes, that the precipitate formed in this case contains no water, and consists of about 63 protoxide of copper, combined with 37 sulphuretted chyazic acid.

Some Experiments on the Combustion of the Diamond and other carbonaceous Substances. By Sir Humphry Davy, LL.D. F.R.S. V.P.R.I. Read June 23, 1814. [Phil. Trans. 1814, p. 557.]

Notwithstanding the many accurate experiments which have been made and recorded, showing that diamond and carbonaceous substances combine with the same quantity of oxygen, and form the same quantity of carbonic acid, various conjectures have been formed respecting some difference in their chemical composition, which might account for the remarkable difference in various sensible qualities. Messrs. Biot and Arago conjectured, from the great refractive power of the diamond, that hydrogen must be present. Guyton de Morveau